Amendments to the Claims

The below listing of the claims replaces all prior versions and listings of the claims in the subject application:

1. (Original) A battery safety monitor system, comprising:

a) at least one battery comprising at least one cell string , wherein said at least one cell string is capable of outputting voltage signals;

b) at least one zener diode, operatively coupled to said at least one battery cell string, capable of receiving and reducing voltage signals, and capable of outputting voltage signals;

c) at least one safety device, operatively coupled to said at least one battery cell string, capable of preventing damage to said at least one battery cell string;

d) a microcontroller, operatively coupled to said at least one zener diode, capable of receiving and outputting data;

e) a display device, operatively coupled to said microcontroller, capable of receiving data, and capable of displaying at least one battery voltage level;

f) a power supply, operatively coupled to said microcontroller and said display device, capable of supplying power to said microcontroller and said display device.

2. (Original) The battery safety monitor system of Claim 1, wherein said safety device is selected from the group consisting of PTC, thermal fuse, fuse, isolation diode, wetness detector and optoisolator.

3. (Original) The battery safety monitor system of Claim 1, wherein said display device is selected from the group consisting of visual alarms, audible alarms, relay switches and serial interfaces coupled to display computers.

4. (Original) The battery safety monitor system of Claim 1, wherein said at least one battery comprises a plurality of batteries, wherein said battery safety monitor system further comprises an analog multiplexer, operatively coupled to said plurality of batteries and said at least one zener diode, capable of selectively receiving voltage signals from one of said plurality of batteries.

5. (Original) The battery safety monitor system of Claim 1, wherein said battery safety monitor system further comprises an A/D converter, operatively coupled to said at least one zener diode and said microcontroller, capable of converting voltage signals to digital signals, and capable of outputting digital signals to said microcontroller, and capable of receiving control signals from said microcontroller.

6. (Original) The battery safety monitor system of Claim 1, wherein said battery safety monitor system further comprises an optoisolator, operatively coupled to said microcontroller, said power supply and said at least one display device, capable of preventing reverse currents, and capable of receiving and transmitting digital signals, and capable of receiving power from said power supply.

7. (Original) A battery safety monitor system, comprising:

a) at least one string unit, comprising:

i) at least one battery cell string capable of outputting voltage signals;

ii) at least one safety device, operatively coupled to said at least one battery cell string, capable of preventing damage to said at least one battery cell string;

b) at least one battery monitor, operatively coupled to said at least one string unit, comprising:

i) at least one zener diode capable of receiving and reducing voltage signals, and capable of outputting voltage signals;

ii) a first microcontroller, operatively coupled to said at least one zener diode, capable of receiving and outputting data;

c) a data collection and display device, operatively coupled to said at least one battery monitor, comprising:

i) a display device capable of receiving data, and capable of displaying at least one battery voltage level;

ii) a power supply, operatively coupled to said battery monitor and said display device, capable of supplying power to said battery monitor and said display device.

8. (Original) The battery safety monitor system of Claim 7, wherein said at least one battery monitor further comprises:

iii) an analog MUX, operatively coupled to said at least one string unit and said at least one zener diode, capable of selectively receiving voltage signals from one of said at least one string unit, and capable of outputting voltage signals to said at least one zener diode.

iv) an A/D converter, operatively coupled to said at least one zener diode and said first microcontroller, capable of converting voltage signals to digital signals, and capable of outputting digital signals to said first microcontroller, and capable of receiving control signals from said first microcontroller

v) an optoisolator, operatively coupled to said first microcontroller and said data collection and display device, wherein said optoisolator is capable of preventing

reverse currents, and capable of receiving and transmitting digital signals, and capable of receiving power from said power supply.

9. (Original) The battery safety monitor system of Claim 8, wherein said optoisolator further comprises:

(1) a serial interface, operatively coupled to said microcontroller and said optoisolator, capable of receiving and outputting digital signals;

(2) a connector, operatively coupled to said optoisolator and said data collection and display device, capable of receiving and outputting digital signals, and capable of receiving and outputting power.

10. (Original) The battery safety monitor system of Claim 9, wherein said serial interface comprises a UART.

11. (Original) The battery safety monitor system of Claim 9, wherein said connector comprises long wires.

12. (Original) The battery safety monitor system of Claim 8, wherein said at least one battery monitor further comprises a wetness detector, operatively coupled to said A/D converter, wherein said wetness detector is capable of detecting dangerous battery conditions.

13. (Original) The battery safety monitor system of Claim 7, wherein said data collection and display device further comprises:

iii) a second microcontroller, operatively coupled to said at least one display device and said power supply, capable of transmitting control signals, and capable of receiving and outputting power.

iv) a digital MUX, operatively coupled to said at least one battery monitor, said second microcontroller and said at least one power supply, capable of selectively

receiving digital signals from one of said at least one battery monitor, and capable of receiving control signals from said second microcontroller, and capable of receiving power from said power supply, and capable of outputting digital signals.

14. (Withdrawn) A method for a battery safety monitor system, the method comprising the steps of:

a)measuring string voltage using said battery safety monitor system;

b)determining whether string voltage dropped a predetermined amount since last measurement;

c)displaying an alert if string voltage dropped said predetermined amount and proceeding to STEP (h);

d)determining whether string voltage is below a safe threshold;

e)displaying an alert if string voltage is below said safe threshold and proceeding to STEP (h);

f)determining whether wetness is detected;

g)displaying an alert if wetness is detected and proceeding to STEP (h);

h)displaying a status of at least one battery;

i)returning to STEP (a).

15. (New) The battery safety monitor system of claim 1 wherein said at least one battery is lithium based.

16. (New) The battery safety monitor system of claim 12, wherein said wetness detector comprises two narrowly spaced conductors that are operatively coupled to a high impedance voltage and an input of said A/D converter, wherein said wetness detector is configured to produce a reduced voltage when thionyl chloride condenses on said two narrowly spaced conductors.

17. (New) A battery safety monitor system, comprising:

a) a battery cell string capable of outputting voltage signals;

b) a safety device, electrically coupled in series to said battery cell string, wherein said safety device is capable of preventing damage to said battery cell string;

c) a battery monitor operatively coupled to receive said voltage signals, said battery monitor comprising:

i) a zener diode configured to generate low voltage signals responsive to said voltage signals;

ii) an A/D converter configured to transform said low voltage signals into digital signals; and

iii) a first microcontroller configured to transform said digital signals into output digital signals representative of a voltage level of said battery cell string, wherein said first microcontroller is capable of transmitting control signals; and

d) a display device configured to receive said output digital signals, said display device capable of displaying battery conditions; and

e) a separate power supply, operatively coupled to said battery monitor and said display device, capable of supplying power to said battery monitor and said display device.

18. (New) The battery safety monitor system of claim 17, wherein said battery monitor further comprises:

iv) an analog multiplexer configured to receive said control signals, wherein said analog multiplexer is disposed to selectively allow said voltage signals from one battery of said battery cell string to be received by said zener diode in response to said control signals from said first microcontroller; and

v) an optoisolator, configured to transform said output digital signals into isolated digital signals, wherein said display device is configured to receive said isolated digital signals, wherein said separate power supply is configured to supply said power to said optoisolator, and wherein said optoisolator is capable of preventing reverse currents from entering said battery cell string.

19. (New) The battery safety monitor system of claim 18, wherein said optoisolator further comprises:

(1) a serial interface, configured to receive said output digital signals from said first microcontroller; and

(2) long wires, configured to receive said power and to guide said isolated digital signals to said display device such that said display device is located remotely from said battery monitor.

20. (New) The battery safety monitor system of claim 18, further comprising a plurality of said battery cell strings and a plurality of said battery monitors, wherein each of said battery monitors is configured to receive said voltage signals from one of said battery cell strings, and said battery safety monitor system further comprises:

f) a digital multiplexer disposed to receive said isolated digital signals from said plurality of battery monitors; and

g) a second microcontroller configured to transmit second control signals to said digital multiplexer, wherein said digital multiplexer is disposed to selectively allow said isolated digital signals from one of said plurality of battery monitors to be received by said second microcontroller in response to said second control signals, and said second microcontroller is disposed to transform said isolated digital signals into second output digital signals, wherein said second microcontroller is configured to transmit said second output digital signals to said display device.

21. (New) The battery safety monitor system of claim 20, wherein said safety device comprises:

i) a positive thermal coefficient device operatively coupled in series with and in close proximity to said battery cell string, wherein said positive thermal coefficient device provides overcurrent protection to said battery cell string;

ii) a thermal fuse operatively coupled in series between said positive thermal coefficient device and said battery cell string, wherein said thermal fuse is in close proximity to said battery cell string;

iii) a fuse operatively coupled in series with said battery cell string, wherein said fuse is configured to provide overcurrent protection to said battery cell string; and

iv) an isolation diode operatively coupled in series between said fuse and said analog multiplexer, wherein said isolation diode prevents reverse currents from entering said battery cell string.